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NASA TECH BRIEF

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One-Dimensional Multimode and Multistate Oscillator: A Concept

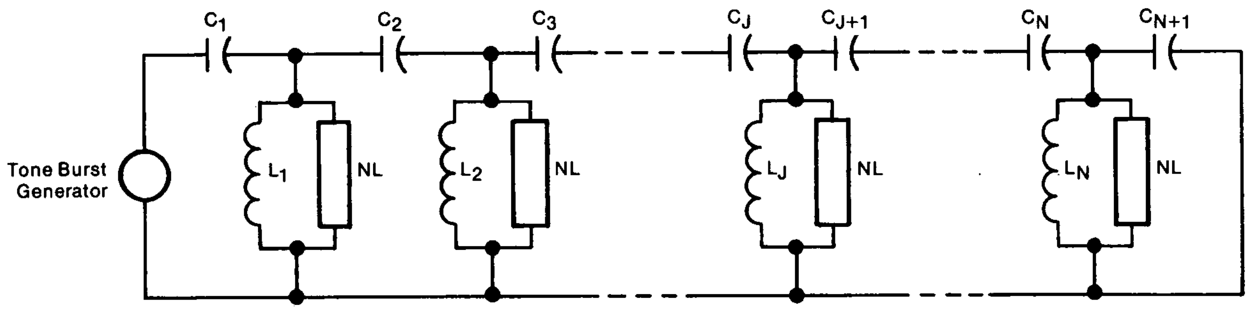

Figure 1. Line Oscillator

A one-dimensional multimode and multistate oscillator has been proposed as shown in Figure 1. The device is also called a line oscillator because its voltage amplitude distribution is similar to that of standing waves on a transmission line. It can be used for fast, efficient information encoding, decoding, and memory.

The device operates in response to a brief tone burst such as that generated by a Touch-Tone telephone. It sets up a standing-wave mode of oscillation which is unique for each possible burst frequency. This mode of oscillation may or may not be retained indefinitely depending on the line parameters selected. The number of sections N determines the number of discrete frequencies of the oscillator. The values of the inductors L and the capacitors C can be selected by known network synthesis methods to yield any desired frequencies.

Depending upon the type of nonlinear elements used and the number of sections, the line oscillator may oscillate simultaneously at certain combinations of frequencies (multimode), or it may operate at any of these frequencies alone (multistate). Component tolerances are not critical; however, the nonlinear elements have to be reasonably well matched. One example of a nonlinear element is shown in Figure 2.

The number of cycles in a burst required to insure oscillation is less than or equal to the number of line sections. The oscillator can be fabricated with existing integrated-circuit techniques.

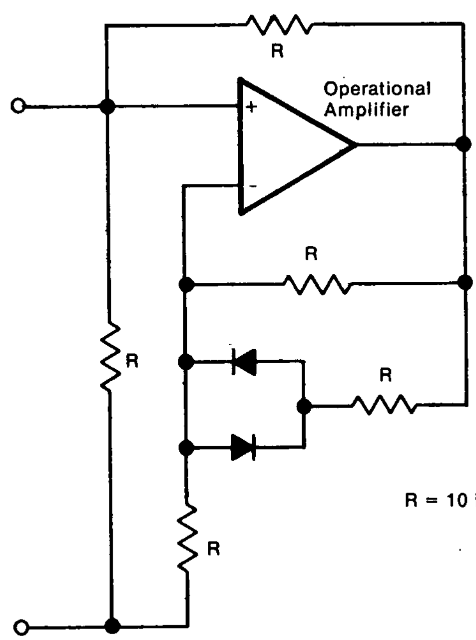

Figure 2. Typical Nonlinear Element

(continued overleaf)

Note:

Requests for further information may be directed to:

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NASA Headquarters
Code KT
Washington, D. C. 20546
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Patent status:

Title to this invention has been waived under the provision of the National Aeronautics and Space Act [42 U.S.C. 2457(f)], to the University of Wisconsin, Madison, Wisconsin 53706

Source: Herbert M. Aumann of
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